PUGET SOUND ENERGY

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Greg Nothstein
Washington Department of Commerce
1011 Plum Street SE
PO Box 42525
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RE: Comments on Washington State Emission Performance Standard and the Department's Reliability and Cost Analysis

Dear Mr. Nothstein,

Puget Sound Energy (PSE) is the largest investor-owned utility in Washington State, serving more than 1.1 million electric customers. PSE has long supported sound public policy to reduce greenhouse gas emissions. PSE is also committed to providing its customers with safe, reliable and affordable electricity. PSE participated in the development of the Engrossed Substitute Senate Bill 6001 in 2007, now codified at RCW chapter 80.80, and PSE appreciates the opportunity to participate in the Department of Commerce's effort to implement the on-going requirements of that legislation.

PSE urges the Department of Commerce to maintain the Emission Performance Standard (EPS) at its current 1,100 lbs/MWh level. Regulation recently enacted by the U.S. Environmental Protection Agency (EPA) requires that all newly constructed power plants be constructed with state-of-the-art efficiency measures. Lowering the Emission Performance Standard for existing units is not warranted under the statute at this time and new units are covered under EPA's new rule. If the standard is lowered, as currently being contemplated by the Department, utilities will be prevented from entering into long-term contracts with much of the region's existing natural gas-fired combined-cycle combustion turbine fleet, potentially stranding those resources and encouraging utilities to rely on less efficient peaking resources, more expensive and volatile short-term market purchases, and possibly newly constructed resources that are not otherwise needed to meet projected load requirements. System reliability would be adversely affected and customer costs would rise, contrary to the Legislature's intent, without any clear environmental benefit.

On July 20, 2012, PSE received the Department's draft document entitled "Reliability and Cost Analysis: Supporting the Washington emissions performance standard for baseload electric generation." By letter dated July 27, 2012, we requested additional time to respond to this document and suggested that the Department postpone its next Emission Performance Standard meeting in order for interested parties to gather relevant information and for the Department to complete a rigorous analysis of cost and reliability issues as required by statute.

In the meantime, however, PSE has several concerns about the Department's current approach to implementing RCW chapter 80.80, and about the draft Reliability and Cost Analysis.

The Department's Obligations Under RCW Chapter 80.80

The Department appears to be moving quickly to revise the Emission Performance Standard in a manner that would be inconsistent with RCW chapter 80.80, that would not address the Department's other obligations under the statute and that would not be aligned with the Legislature's intent in adopting the statute. The following sections summarize some of PSE's concerns about the Department's approach:

1. The Department should not amend the Emission Performance Standard before the Legislature can consider the EPS's on-going need, applicability and effectiveness.

RCW 80.80.080 requires the Departments of Ecology and Commerce consult with each other, and report to the Legislature concerning the ongoing "need, applicability and effectiveness" of the Emission Performance Standard "every five years following July 22, 2007, or upon implementation of a federal or state law or rule regulating carbon dioxide emissions of electric utilities."

The Washington Legislature adopted the legislation enacting the EPS at a time when there was no federal regulation of greenhouse gas emissions from electric generating resources. Since then, the federal government has implemented aggressive national regulations. In May 2010, EPA adopted the Tailoring Rule, defining which sources will require Clean Air Act permits regulating greenhouse gas emissions. As a result, since January 2011 new gas-fired electric generating facilities have been required to demonstrate the use of best available control technologies (BACT) for greenhouse gas emissions.

EPA's Tailoring Rule is a very effective and stringent regulation restricting greenhouse gas emissions. It will result in continuing reductions in greenhouse gas emission rates as new generating facilities come into service. For example, in February 2010 and prior to implementation of the Tailoring Rule, the Bay Area Air Quality Management District in California issued a final permit for the Russell Creek Energy Center, determining that a 56.4% thermal efficiency, equivalent to 7,730 Btu/kWh and based upon a designed heat rate of 6,852 Btu/kWh, is BACT. Based on this heat rate, the upper range of emissions from this facility will be approximately 895 lbs/MWh of greenhouse gases. The New York State Department of Environmental Conservation is currently writing a permit for the proposed Cricket Valley Energy Project, and is proposing a 57.7% thermal efficiency BACT limit, equivalent to 7,605 Btu/kWh and based upon a designed heat rate of 6,742 Btu/kWh at full load. Based on this heat rate, the upper range of emissions from this facility will be approximately 880 lbs/MWh of greenhouse gases.

Under EPA's Tailoring Rule, GHG BACT is a continuous process and is re-evaluated for each new major stationary source and major modification. In addition, BACT determinations are project and site specific, which is an important trait that the Washington EPS does not share. Over time, BACT requirements will reduce greenhouse gas emissions from combined-cycle generating facilities. This federal regulation makes earlier state efforts to reduce greenhouse gas emissions, including Washington's Emission Performance Standard, unnecessary. The Department should not move forward with efforts to lower the EPS without considering the new federal requirement and whether the state standard is still needed, applicable and effective, and before reporting its conclusion to the Legislature, as required under the statute. The Tailoring

Rule is a more effective and efficient regulatory vehicle for limiting GHG emissions. In light of the Tailoring Rule, the Legislature should be given the opportunity to consider whether to the EPS is still needed before the Department of Commerce proposes a lower Standard.

2. The Department is focusing on new turbine technology exclusively and not considering emission rates associated with existing electric generating resources available to Washington utilities.

RCW 80.80.050 requires the Department of Commerce to do two different things, every five years:

- Develop a "survey of new combined-cycle natural gas thermal electric generation turbines commercially available and offered for sale by manufacturers in the United States to determine the average rate of emissions of greenhouse gases for these turbines," and report the results of the survey to the Legislature.

- "[A]dopt by rule the average available greenhouse gas emissions output."

The Department seems to be combining these two requirements by proposing a new Emission Performance Standard that applies to all power plants (both existing and new) based on this survey of new units available for sale. In fact, each task has a very different focus. The survey focuses on new turbine technology, but the Emission Performance Standard focuses on average emissions from electricity generation that is actually available to Washington utilities. Although it may be possible today to purchase a new turbine that would have a significantly lower greenhouse gas emission rate, that particular turbine may have not yet been installed at any generating facility in the country much less in the Northwest. In fact, considering the effort required to finance and site a new plant it could be many years before electricity generated by the turbine is actually available for purchase by Washington utilities.

As with other reports the Legislature required, the survey of new turbine technology was intended to provide information to the Legislature so that it could consider the on-going appropriateness of the EPS. Although the survey results help to inform the Department on the emissions for the most current CCCT technology available, the emissions associated with the existing northwest region CCCT fleet is much more relevant evaluating an appropriate EPS.

3. The Department is failing to seriously consider the potential effects of a lower Emission Performance Standard on system reliability and customer cost.

RCW 80.80.040(11) provides that "[i]n adopting and implementing the greenhouse gas emission performance standard, the department of commerce energy policy division . . . . shall consider the effects of the greenhouse gas emissions performance standard on system reliability and overall costs to electricity customers." This explicit requirement echoes an emphasis on reliability and cost that runs throughout the statute. For example, the Legislative findings stress the importance of ensuring "an adequate, reliable and cost-effective supply of electricity." RCW 80.80.005(1)(h). The Legislature also authorized the Washington Utility and Transportation Commission (WUTC) and the governing boards of consumer owned utilities to grant exemptions on a case-by-case basis when necessary to address system reliability or avoid extraordinary cost impacts. RCW 80.80.060(4), 80.80.070(4). The statute read as a whole shows that maintaining reliable and cost-effective electricity supply was of paramount concern to the Legislature.

PSE does not agree with the Department of Commerce's questioning of whether there is an on-going obligation to consider the effects of its actions on system reliability and customer cost. See Reliability and Cost Analysis at 1. The initial reliability and cost analysis done back when the statute was first promulgated could not have sufficiently predicted markets and economic development such that an on-going analysis would not be necessary when the standard is modified through a new rulemaking process every five years.

PSE urges the Department to take this obligation seriously and conduct a thorough analysis of the potential implications of a change in the Emission Performance Standard on the reliability and cost of electricity.

4. The Department does not appear to have considered environmental impacts of a new lower EPS.

From the Department's meetings, publications and communications thus far, it seems that there has been no consideration of the extent to which a change in the Emission Performance Standard could have an environmental impact. There may simply be an assumption that any reduction in the EPS would have a positive environmental impact.

As discussed more fully below in connection with the Draft Cost and Reliability Analysis, it is important that the Department fully consider the potential effects of a lower Emission Performance Standard on electricity supply and any associated environmental impact. Lowering the standard substantially would prohibit Washington utilities from entering into long-term contracts with the many existing natural gas-fired combined cycle combustion turbine facilities. This could jeopardize the economic viability of the existing fleet of gas-fired CCCTs in the region and result in utilities relying more heavily upon simple-cycle peaking facilities, which are less efficient and generally have higher emission rates of both criteria pollutants and greenhouse gases. It could also incentivize utilities to build new exempt resources or new combined-cycle generating resources that would comply with a lower standard, both of which would result in the environmental impacts associated with new construction.

The Draft Cost and Reliability Analysis is Inadequate

The draft Cost and Reliability Analysis circulated by email on July 20, 2012 is an inadequate analysis of the effect of a lower standard. The draft provides no data and little explanation to support those conclusions, and provides no references where supporting data or analysis might be found. The analysis is also incomplete and contains many incorrect assumptions.

In the limited time provided, PSE has not been able to thoroughly analyze the draft, gather all of the relevant factual materials, and perform the sort of market analysis that the Department should perform. At this point, however, PSE has the following preliminary comments concerning the document.

1. The Department has not performed a thorough analysis of the potential effects of a lower Emission Performance Standard on system reliability and customer cost.

The Department's draft document does not provide the thorough consideration of system reliability and cost issues required by the statute. The draft document identifies the implications of a lower Emission Performance Standard on each type of utility power acquisition, concluding that it would prohibit some acquisitions, potentially affect some, and have no impact on others. The draft document, however, does not look at the overall impact of a lower standard on the

regional electric system. It does not consider how a lower EPS might change acquisition decisions by utilities, decrease opportunities for resource owners, and alter incentives for future development. For example, it does not consider the following possibilities:

- Whether a lower emission performance standard would increase utility reliance on short-term power purchase contracts, and the extent to which such an increase might affect system reliability and customer costs.

- Whether a lower emission performance standard would increase utility reliance on non-baseload resources (including less efficient simple-cycle peakers), and the extent to which such an increase might affect system reliability and customer costs and have the unintended consequence of increasing emissions.

- Whether a lower emission performance standard would decrease the utilization of existing regional gas-fired CCCT resources, possibly "stranding" many of those resources, and the extent to which such an increase might affect system reliability and customer costs and have the unintended consequence of increasing emissions.

- Whether a lower emission performance standard would accelerate the construction of new gas-fired generation resources in the region, and the extent to which that could affect system reliability and customer costs along with environmental impacts from new construction.

- Whether a lower emission performance standard would indirectly increase utility reliance on out-of state resources, and the extent to which that could affect system reliability and customer costs.

These are just some of the ways that a lower EPS might change the resource mix relied upon by Washington utilities, and might change the operation of the regional electric market. The Department should have analyzed these and other possibilities in detail and presented data to support its analysis. We would also expect to see modeling of alternative scenarios in a complete analysis document.

2. The Draft Reliability and Cost Analysis does not adequately address the potential effect of a lower Emission Performance Standard on the existing fleet of gas-fired CCCTs in the region.

According to the Northwest Power and Conservation Council (NPCC), there are currently twenty CCCT facilities located in the Northwest[1]. The greenhouse gas emission rates associated with these facilities vary based on a number of factors, including the turbine model, relative size of gas and steam turbines, the availability and use of supplemental duct firing, the ability to operate on oil as well as gas, the degree to which efficiency factored into facility design, permitting and operation, and the operating characteristics and demands of the facility. According to the NPCC, the maximum heat rate of these facilities varies from 6,925 Btu/kWh to 9,225 Btu/kWh. These heat rates result in greenhouse gas emission rates ranging from 825 lbs/MWh to 1,070 lbs/MWh under ideal circumstances when operating a full load.

[1] Northwest Power and Conservation Council, Power Plants in the Pacific Northwest & System Planning Assumptions; February 6, 2012.

Of course, even if a facility is capable of achieving emission rates between 925 and 975 lbs/MWh under ideal full load operations, its actual emission rate may at times be much higher. Operational requirements to meet load such as (1) frequent startups and shutdowns, (2) partial load generation, (3) ramping to meet wind integration, and (4) increased operation during less optimal ambient conditions (such as extreme weather circumstances) *can all increase greenhouse gas emission rates at any particular time*. No other electric generation sources have the start up flexibility and efficiency of CCCTs to meet changing load. Increasingly, utility system stability and reliability considerations make it so CCCTs are needed to ramp generation up and down, on and off, and over a wider range of conditions to respond to load variability and compensate for hydro conditions that vary from year to year, and new intermittent resources. This capability comes at a cost with respect to efficiency, significantly increasing heat rate and greenhouse gas emissions rate. Consequently, even if a facility might be able to comply with a lower standard under ideal conditions, average actual output is likely to be as much as 1,050 lbs/MWh in practice. Based on these factors, a lowering of the Emission Performance Standard, as suggested in the draft document, would prohibit Washington utilities from purchasing or entering into a long-term (5 or more years) contract with a significant segment of the existing CCCT fleet in the region that is not owned by PSE.[2]

3. The Draft Reliability and Cost Analysis erroneously assumes that gas-fired combined cycle generating facilities play no meaningful role in the Washington resource mix.

The Department's draft document states that CCCTs currently serve 10-11% of Washington's electric load, and concludes that the remaining approximately 90% of the resource mix will ensure stable system costs and reliability regardless of how the Emission Performance Standard may affect the use of CCCTs. This assumption is not explained or supported by any data, analysis or system wide modeling.

In PSE's view, the 10-11% of the state's electricity resource provided by CCCTs is significant in itself, and PSE expects that share to grow in the future as hydropower resources become a decreasing percentage of the mix, and as intermittent resources (with variable output, such as solar and wind) increase. Until there is a reliable and cost effective means of storing intermittent power, cycling CCCTs will be a cost effective and efficient way of supporting renewables. If CCCTs become unavailable, there would surely be an impact on price and on the ability to meet demand during peak load periods. More importantly, the region's gas-fired CCCTs provide a combination of flexibility and efficiency that no other resource equals, and this combination is essential for utilities to provide reliable electric service. Utilities must constantly be reacting to variations in load, changes in the availability of hydropower, variations in the amount of intermittent supply, and both periodic and unanticipated shutdowns of baseload resources. Without the ability to rely upon the existing fleet of CCCTs, utilities will either have to sacrifice reliability, or pay more for less efficient resources.

A change in the Emission Performance Standard would plainly affect system reliability and cost. The question is the extent of the effect. Sophisticated system wide modeling would be required

[2] It is important to keep in mind that existing facilities have limited ability to reduce their greenhouse gas emission rates, without replacing the turbines and essentially re-building the facilities at the cost of hundreds of millions of dollars. Short of that kind of modification, the options available to a CCCT for efficiency improvements include air intake modification, turbine blade replacement options, and complete steam unit rebuilds. At most these changes might result in a 1% to 2% efficiency gain, nowhere near what is needed to the lower Emission Performance Standard being contemplated.

to evaluate potential size of the effect. The Northwest Power and Conservation Council performs this kind of modeling when it prepares its regional power plans, and we would expect the Department would conduct a similarly sophisticated analysis before recommending a significant change in the EPS.

As pointed out above, gas-fired CCCTs are diverse and invaluable resources to the western energy market and to the customers that rely on their ability to provide reliable power supply. The benefits to maintaining a diverse fleet of combined-cycle plants in the region includes fast response and flexibility. In today's power market environment, where electricity price, load demand, and intermittent renewables integration are often uncertain, combined-cycle units are instrumental in facing rapid changes in energy demand and shaping.

4. The Draft Reliability and Cost Analysis erroneously assumes that a shift to short-term power purchases would have no effect on system reliability or price.

The Department's draft document suggests that a change in the EPS would have no impact on system reliability or price because utilities could simply enter into short-term power purchase agreements with non-compliant gas-fired CCCTs. That assertion is likely inaccurate.

PSE, like many utilities, devotes significant effort to a long-term resource planning process that results in the acquisition of generation resources through the Request-for-Proposals (RFP) process. Mandated by State law, our Integrated Resource Plan (IRP) is our strategic road map for securing reliable and cost-effective energy resources and lays the foundation to secure reliable and low cost resources in the RFP. It consists of a thorough research-based examination of the potential risks and opportunities the company faces in procuring future energy supplies. PSE uses a twenty-year horizon when considering its load-resource balance. Having the ability to enter into long-term contracts with baseload CCCTs provides an important element in the planning and procurement process.

On average, approximately 35-40% of PSE's total electric output to serve load is generated by PSE and the remainder is purchased. Of the purchased power, approximately 20% is procured directly from natural gas turbines located in the region. The total amount of power delivered to customers from PSE-owned CCCTs and contracted purchases from CCCTs is approximately 10%. Like most utilities, PSE does not have sufficient PSE-owned generating capacity to meet all the demand in its footprint, and therefore it must procure electricity from other interconnected power plants, wholesale marketers and other utilities. PSE operates and contracts in this manner so that it can leverage economies of scale with respect to power supply, thereby securing lower rates for its customers, consistent with least-cost requirements imposed by utility regulation in the State of Washington.

Utilities like PSE have at times in the past acquired existing CCCTs rather than entering into long-term power purchase agreements because the acquisition route is lower cost to ratepayers in the long term and provides greater system reliability. If the Emission Performance Standard is lowered substantially, utilities like PSE would not be able to enter into long-term power purchase agreements or acquire existing CCCT facilities. The combination would threaten system reliability and increase costs.

Short-term contracts necessarily provide less certainty and stability over the long run. Short term contracts also provide less ability to control costs and would make PSE more susceptible to market price fluctuations. In fact, many of the procurement options offered to PSE in its RFP process are from CCCT facilities in the form of either long-term contracts or asset sales. A

significant segment of natural gas capacity in the NWPP is made with IPPs via contracted terms. A shift to short-term contracts could very well push prices up and will certainly increase price volatility experienced by customers. If the owners of existing CCCTs cannot spread their costs over a long-term contract, they will be forced to either spread those same costs over a shorter term contract, which could increase the price; decline to sell into the Washington market, which will have the effect of increasing prices by reducing supply; or even decide to mothball their plants, which has the same effect. Moreover, if CCCT owners were only able to enter into short-term contacts, they may also be unable to take advantage of the potential costs savings associated with entering into long-term agreements including gas transportation contracts, long-term firm transmission contracts, or operating and maintenance (O&M) contracts. To the extent that this increases their operating costs, those higher costs will eventually be reflected in power costs as well. Along the same lines, they would be averse to entering into long-term firm transmission and firm gas transportation agreements, which would negatively impact the reliability of such plants.

These are complicated issues that deserve sophisticated analysis. Without explanation, the Department's draft document states that it believes that "the price penalty for a 4.9 year contract vs. a 10 year contract will be minimal or non-existent." PSE does not understand the basis for this statement and it is contrary to PSE's experience - the shorter the contract, the shorter the period to spread costs. A seller who must spread costs and risks over five years, rather than ten (not to mention the possibility of a 15 or 20 year contract), must necessarily charge more under a five-year contract than a ten-year contract. A much more detailed analysis is required to evaluate the potential price penalty and system-wide impact.

5. The Draft Reliability and Cost Analysis fails to consider whether a lower Emission Performance Standard would effectively strand much or all of the existing Northwest fleet of combined-cycle generating facilities, and result in the construction of new generating facilities that would otherwise not be needed to meet projected load requirements.

As discussed above, much of the existing fleet of CCCTs would not be able to comply with an Emission Performance Standard set at the levels currently contemplated by the Department. If these facilities cannot comply with the standard, they have limited options. The facilities could shut down, or operate only when they are able to obtain short-term contracts on suitable terms. Alternatively, if those facilities choose to upgrade to the new standard, cost implications to our customers would be significant.

The Department's draft document states that limiting contracts to less than five years "does not materially affect their ability to operate to meet load." No analysis is provided to support this bold conclusion. The owner of a CCCT bears much greater risk under a short-term contract. The economic benefit of that contract would have to be higher to justify bearing that risk. An owner might also decide to forego necessary O&M or other investment if the owner is not able to guarantee a long-term return, and reduced O&M will directly affect system reliability. The Department's draft document provides no analysis of the likely affect on the existing fleet and how stranding some or all of the fleet might impact system reliability and cost.

If PSE and other utilities cannot enter into long-term power purchase agreements with existing CCCTs, they could either construct new generating facilities or enter into long-term agreements to purchase power from new facilities constructed by others. If these new facilities were gas-fired CCCTs, the new facilities would have slightly lower greenhouse gas emission rates at substantially higher cost, but the new facilities would create a resource surplus that would not

otherwise be necessary to meet projected load requirements. More likely, the new facilities would be gas-fired simple-cycle combustion turbines, which would not fall under the requirement, but have the unintended consequence of both increasing costs to customers and increasing emission rates.

The Legislature did not intend the statute to make existing CCCTs obsolete and require new facilities to be constructed every five years. Stranding relatively new facilities and requiring substantial new construction would certainly have an impact on customer cost. Given the considerable time associated with permitting and construction of new facilities, it is also likely to have an impact on system reliability. The Department should evaluate these potential effects in its analysis.

6. The Draft Reliability and Cost Analysis seems to assume that utilities could and even should ignore statutory requirements.

In discussing the potential cost implications of a lower Emission Performance Standard, the Department's draft document points out that "[t]he law does not impose a direct financial penalty (a fine) on the utilities that own, purchase power, or sign short-term contracts with electricity generators that exceed the performance standard." PSE does not understand this statement. The Emission Performance Standard does not apply to facilities owned by utilities prior to June 30. 2008, or to power purchased under short-term contracts, so of course, utilities would not be fined for complying with the statute. Going forward, however, any new facility construction, acquisition or long-term contracts must comply with the EPS. The Department of Commerce has not performed a thorough analysis of how a lower standard would affect system reliability and cost.

Conclusion

For these reasons, PSE urges the Department of Commerce to reconsider its approach to implementing RCW chapter 80.80. We look forward to a meaningful discussion about the continued need for the Emission Performance Standard in light of existing federal regulation. If a continued need is established, PSE would be happy participate in the Department's required comprehensive evaluation of available system wide electric generation resources and a robust analysis of the potential reliability and cost implications of changing the Emission Performance Standard.

Please contract me directly at 425-456-2561 to discuss any of these issues.

Sincerely,

Keith Faretra
Senior Resource Scientist

Cc: Rogers Weed, DOC
Keith Phillips, Governor's Policy Office
Dave Danner, WUTC
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